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10/642,602	08/19/2003	Fumio Futami	1344.1123	2838

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EXAMINER	
CURS, NATHAN M	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/642,602	FUTAMI ET AL.	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☒ Claim(s) *16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *23 June 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 14, the claim recites that "said clock extracting unit is shared with two or more signal lights included in said time division multiplexed signal light". However, in claim 13, from which claim 14 depends, the claim recites that "said clock extracting unit and said signal light receiving unit are respectively provided for each of said plurality of signal lights". The specification does not enable said clock extracting unit to be simultaneously provided for each of the plurality of signal lights as well as shared with two or more of the signal lights.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3 and 5-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art ("AAPA") (specification fig. 15 and page 1, line 17 to page 5, line 2 and page 9, lines 9-18) in view of Kajiya et al. ("Kajiya") (US Patent No. 7092643).

Regarding claim 1, AAPA discloses a separating apparatus for time division multiplexed signal light, which is input with time division multiplexed signal light obtained by multiplexing a plurality of signal light on a time axis, and guides said time division multiplexed signal light, respectively, to a first optical gate section in which the transmittance thereof is periodically changed in accordance with a repetition frequency of "n" times a bit rate of said signal light (n is a positive integer excluding 1) (fig. 15, element 101 and page 3, line 33 to page 4, line 4), and to a second optical gate section connected in series to said first optical gate section, in which the transmittance thereof is periodically changed in accordance with a repetition frequency equal to the bit rate of said signal light (fig. 15, element 102 and page 4, lines 4-9), to separate at least one signal light included in said time division multiplexed signal light on the time axis (page 3, lines 22-31), wherein said first optical gate section comprises: a first optical modulator in which an optical transmission characteristic thereof with respect to a drive voltage is periodically changed (fig. 15, element 101 and page 3, line 33 to page 4, line 4), and a first drive circuit that supplies to said first optical modulator a drive signal having a repetition frequency twice the bit rate of said signal light (fig. 15, elements 105 and 106 and page 4, lines 4-9), and having the voltage magnitude corresponding to a voltage difference in an 1/2 period in the periodic optical transmission characteristic of said first optical modulator. AAPA discloses EA optical modulators for TDM separating/demultiplexing where each EA optical modulator is used as an on/off gate (page 3, lines 15-31), but does not disclose that the drive signal to the first modulator has a frequency equal to that of the bit rate of the signal light and having the voltage magnitude corresponding to a voltage difference in an n/2 period in the periodic optical transmission

characteristic of said first optical modulator. Kajiya discloses an EA optical modulator for TDM transmitting where the EA optical modulator is used as an on/off gate, and where the output signal frequency of the modulator is twice the driving signal input frequency when the modulation factor is doubled (page 1, lines 18-65). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an MZ optical modulator for the first EA modulator of AAPA and to then double the modulation factor of the drive signal for the first modulator of AAPA, to provide the benefit of producing the desired transmittance rate for the first modulator using the bit rate of the signal light.

Regarding claim 2, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 1, wherein said first optical modulator is a Mach-Zehnder optical modulator (Kajiya: page 1, lines 18-65 as applicable to the combination).

Regarding claim 3, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 2, wherein said Mach-Zehnder optical modulator is constructed using a substrate made of lithium niobate (Kajiya: col. 1, lines 28-36).

Regarding claim 5, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 2. The combination as described for claims 1 and 2 does not disclose that said Mach-Zehnder optical modulator is constructed using a material which enables a polarization independent operation. However, AAPA discloses that polarization independent InP MZ modulators are conventional (AAPA: page 9, lines 9-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an InP MZ modulator for the modulator of the combination, to provide the benefit of polarization independent modulation.

Regarding claim 6, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 5, wherein said Mach-Zehnder optical modulator is constructed

using a substrate made of indium phosphorus (Kajiya: col. 9, lines 9-18 as applicable in the combination).

Regarding claim 7, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 1, wherein said first drive circuit generates a drive signal to be supplied to said first optical modulator, by adjusting a phase and voltage magnitude of an electric clock having a repetition frequency equal to the bit rate of said signal light extracted based on the signal light having passed through said first and second optical gate sections (AAPA: fig. 15, element 106 and bias circuit and page 3, line 33 to page 4, line 22).

Regarding claim 8, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 1, wherein said second optical gate section comprises a second optical modulator in which an optical transmission characteristic thereof with respect to a drive voltage is periodically changed, and a second drive circuit that supplies to said second optical modulator a drive signal having a repetition frequency equal to the bit rate of said signal light (AAPA: fig. 15, element 102 and page 4, lines 4-9).

Regarding claim 9, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 8, wherein said second optical modulator is an electro-absorption type optical modulator (fig. 15 and page 4, lines 4-9).

Regarding claim 10, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 8, wherein said second optical modulator is an EA optical modulator, and said second drive circuit supplies to said second optical modulator a drive signal having the voltage magnitude corresponding to a voltage difference of a 1/2 period in the periodic optical transmission characteristic of said second optical modulator (fig. 15, and col. 4, lines 4-9). The combination as described for claims 1 and 8 does not disclose that said second optical modulator is a Mach-Zehnder optical modulator. However, Kajiya also discloses the

benefits of using MZ optical modulators with respect to avoid chirp problems (col. 1, lines 18-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an MZ modulator for the second optical modulator of the combination, based on the chirp-avoidance advantages of MZ modulators taught by Kijiya.

Regarding claim 11, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 8, wherein said second drive circuit generates a drive signal to be supplied to said second optical modulator, by adjusting a phase and voltage magnitude of an electric clock having a repetition frequency equal to the bit rate of said signal light extracted based on the signal light having passed through said first and second optical gate sections (fig. 15, and col. 3, lines 4-9).

Regarding claim 12, AAPA discloses an optical receiving apparatus, which is input with time division multiplexed signal light obtained by multiplexing a plurality of signal light on a time axis, and comprises: a clock extracting unit extracting a clock having a repetition frequency equal to a bit rate of said signal light, based on said time division multiplexed signal light (fig. 15, element 100A and page 3, lines 22-31); and a signal light receiving unit separating said respective signal light included in said time division multiplexed signal light on the time axis to perform reception processing, wherein at least one of said clock extracting unit and said signal light receiving unit includes a separating apparatus for time division multiplexed signal light (fig. 15 and page 3, line 15 to page 4, line 4). AAPA discloses EA optical modulators for TDM separating/demultiplexing where each EA optical modulator is used as an on/off gate (page 3, lines 15-31), but does not disclose that the drive signal to the first modulator has a frequency equal to that of the bit rate of the signal light and having the voltage magnitude corresponding to a voltage difference in an n/2 period in the periodic optical transmission characteristic of said

first optical modulator. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kajiya with AAPA as described above for claim 1.

Regarding claim 13, the combination of AAPA and Kajiya discloses an optical receiving apparatus according to claim 12, wherein said clock extracting unit and said signal light receiving unit are respectively provided for each of said plurality of signal lights included in said time division multiplexed signal light (AAPA: page 3, lines 15-31).

Regarding claim 14, the combination of AAPA and Kajiya discloses an optical receiving apparatus according to claim 13, wherein said clock extracting unit is shared with two or more signal lights included in said time division multiplexed signal light (AAPA: fig. 15, element "10Ghz electric clock").

Regarding claim 15, the combination of AAPA and Kajiya discloses an optical transmission system, wherein time division multiplexed signal light obtained by multiplexing a plurality of signal lights on a time axis is transmitted from an optical transmission apparatus to an optical transmission line, and said time division multiplexed signal light transmitted via said optical transmission line is received by the optical receiving apparatus recited in claim 12 (AAPA: fig. 15 and page 3 line 22 to page 4, line 9).

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (specification fig. 15 and page 1, line 17 to page 5, line 2 and page 9, lines 9-18) in view of Kajiya (US Patent No. 7092643) as applied to claims 1-3 and 5-15 above, and further in view of Way (US Patent Application Publication No. 2002/0135838).

Regarding claim 4, the combination of AAPA and Kajiya discloses a separating apparatus according to claim 3, but does not disclose a polarization control section that controls a polarization state of the time division multiplexed signal light input to said Mach-Zehnder

optical modulator, to be constant. Way discloses a polarization controller used to control polarization of a signal entering an MZ modulator (fig. 1, elements 118 and 120 and paragraph 0021). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a polarization controller with the MZ modulator of the combination, to provide the benefit of controlling polarization of the signals entering the polarization dependent MZ modulator, as taught by Way

Allowable Subject Matter

6. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LESLIE PASCAL
PRIMARY EXAMINER